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The Many Faces of Distance Education

Albert Dantoni Wiggins III
University of Northern Iowa

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The Many Faces of Distance Education

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Leigh E. Zeitz

6/3/05
Date Approved

Graduate Faculty Reader

6-3-05
Date Approved

J. Ana Donaldson
Graduate Faculty Reader

6/3/05
Date Approved

Greg P. Stefanich
Head, Department of Curriculum and Instruction

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This literature review discusses the educational applications of distance education by examining its historical foundations, its presence and effects on educational curriculums, and its future. The purpose of this literature review is examines research on the topics of how distance education operates and what role distance education plays in the field of education. The conclusions formed within this document are based upon literature reviewed about the topic of distance education and a personal interview. This review has led to a conclusion that distance education offers non-traditional students opportunities to educate and re-educate themselves while simultaneously allowing traditional students a chance to learn through a new method of instruction.

INTRODUCTION

Distance education programs are becoming increasingly popular at academic institutions and corporations. These programs are offering learning opportunities for people who are normally restricted by time and space (Sherry 1996; Moller, 1998; US Department of Education, 2003). Distance education provides an additional dimension to the educational process by allowing learners to be part of the learning experience. Exploring research conducted on how distance education operates and the roles it plays within the discipline of education, we will be able to foretell the future of distant education.

Imagine sitting in a classroom listening to an instructor lecture about topics that you have to absorb like a sponge. Imagine sitting at your kitchen table working on classwork that you received in the mail. Imagine watching and listening to videotapes of classmates or instructors that you have never met. Imagine talking to an instructor or classmate via telephone. Imagine sitting in front of your computer exchanging email and instant messages with classmates and instructors. Now imagine that you are in the "middle of nowhere" and have these types of collaborative capabilities. All of these opportunities are available through distance education.

Vincent (1885) stated:

> The day is coming when the work done by correspondence will be greater in amount than that done in the classrooms of our academics and colleges; when the students who shall recite by correspondence will far outnumber those who make oral recitations (Vincent, 1885 para 1).

Vincent (1885) didn't know how much his quote about correspondence study would hold true one hundred and twenty years later. The day that Vincent predicted is rapidly approaching. There has been a significant increase in providing instruction through distance education. Between 1995 and 2002, two-year institutions of higher learning increased 99% in the number of students being served through distances education (from 10,150 to 20,210). This increase is still escalating (U. S. Department of Education, 2003; National Center for Educational Statistics, 2005). The National Center for Education Statistics (2005) also documents the 104 % increase at public four-year universities (11,470 to 23,390). Lifelong learning is a broad concept where education that is flexible, diverse and available at different times and places is pursued throughout life (Evaluating IT, 2005). Lifelong learning is becoming an important topic. Distance education is becoming a predominant educational method for instruction and learning because distance education can provide learning experiences for those who choose to participate in the distance education experience (Iota, 2000). The relationship between technology and lifelong learning is supported through distance education. The combination of technology and the willingness to learn collectively offers unique opportunities for participating in educational experiences.

Distance Education and distance learning are terms that are used interchangeably when discussing learning that takes place outside of a traditional classroom setting. These terms relate to different varieties of "programs, providers, audiences, and media" (Sherry, 1996 p. 339) that are used in distance learning. For the uses addressed in this literature review, distance education will be defined as the process of providing instruction when students and instructors are separated by physical distance. The

methods of bridging the gap between student and instructors may be achieved through media ranging from postal letters to interactive video conferencing (Willis, 1993; Sherry, 1996; Moller, 1998). Distance learning on the other hand, will be defined as the desired outcome of distance education (Waller, 2004)

The defining characteristics of effective distance education include the separation of the teacher and learner by space and/or time (Perraton, 1988) and communication between student and teacher is conducted through the use of print or other media (Keegan, 1986; Garrison and Shale, 1987; Simonson, Smaldino, Albright, and Zvacek, 2003). Distance education is most effective when the locus of control for learning is assumed by the student instead of the instructor (Jonassen, 1992).

Distance education is important because it is becoming an influential format for instruction and learning (Atkinson, 1999). Before investigating distance education's methodologies, technologies, and its effects on curriculum, it is useful to become familiar with distance education's past and present. Therefore, the historical foundations of distance education will be analyzed. Instructional models and technologies used in the practice of distance education will be described. This review of literature will also explicate the advantages and disadvantages of distance education. It will explore the impact and implications that distance education has on the development of educational curricula and the role of distance education within educational society by exploring those who use it. The researcher will conclude by discussing the future of distance education.

In order to comprehend concepts discussed within this literature review, definitive definitions of the terms in distance education and distance learning are provided.

Definitions

Asynchronous Communication: Two-way interaction between teacher and learner in which there is a time delay in the communicative process. The communication does not take place in regular intervals (Kearsley, 1998).

Audio Conferencing: Conducted through audio only (usually via phone), also referred to as "teleconferencing" (Patton-Bennington, 2005).

Cable Television: Use of a coaxial or fiber optic cable to deliver video signals directly to TV sets. Most systems deliver signals from sender to receiver and receiver to sender (Patton-Bennington, 2005).

Compressed Video Conferencing: A compacted video stream sent over Internet connections that allows two or more participants to participate in a synchronous conferencing environment, although there is a delay in video (Simonson et al., 2003).

Distance Education: Usually occurs in a non-classroom environment or in conjunction with a traditional classroom setting when students participate in course discussions, exercises, and receive assessment from the instructor by using technology to facilitate various methods of instruction (Sherry, 1996; Moller, 1998).

Distance Learning: Distance learning will be defined as the out come of distance education. It involves the change in knowledge and behavior that learners experience through distance education. Distance learning and distance education are terms that are often used interchangeably (Waller, 2004).

Internet: A system of computer networks in which users at one computer can, if they have permission, get information from any other computer, communicate with other computer users around the world (What is, 2005).

Intranets: Internal networks based on transmission and Internet codes of behavior, used by an organization, corporation, or learning institution. It is accessible to only a specific group of members (Schamber, 1988; Fleischman, 1998).

Local Area Network (LAN): A computer network that spans a relatively small area. Most LANs are confined to a single building or group of buildings. However, one LAN can be connected to other LANs over any distance via telephone lines and radio waves (Fleischman, 1998).

Synchronous Communication: Two-way interaction between teacher and learner in real time. There is no time delay in synchronous communication (Kearsley, 1998).

Video conferencing: Programs disseminated through video and audio (e.g. either one-way video, two-way audio with one-way video, or two-way video/audio). This is a form of synchronous communication (Simonson et. al, 2003).

Technology: Technology is the technical means people use to improve their surroundings. It is people using knowledge, tools, and systems to make their lives easier and better (Bergen County Technical Schools, 2005).

The Iowa Communications Network (ICN): The ICN is a digital network that connects locations throughout the state of Iowa via fiber optic cable. Video, voice and data signals are encoded and transferred over the fiber optic network. The two-way audio and visual communication experienced through the ICN usually consists of an origination

site, which is the location where the instructor teaches (also referred to as a face-to-face class) and receiver sites (Iowa Communications Network, 2005).

WEBCT: An on-line management application that supports students in academic classes in a web-based learning environment created by course instructors. Instructors have the ability to post comments and information, grades, past quizzes, and a chat area and bulletin boards, allowing students access to information at any time (WebCT, 2005).

METHODOLOGY

The abundance of literature about distance education made the research process challenging. The researcher had to limit his search to the historical and curricular aspects of the field. The researcher investigated on-line resources including the United States Department of Education Data Bases, ERIC (Educational Resources Information Center), Applied Science & Technology, E*Scribe, and College Source On-line, PsycInfo, and Wilson Web databases provided by the University of Northern Iowa's Rod Library. In acquiring information from the databases, the researcher used the following words/phrases as descriptors: history of distance education; distance learning, theories of distance education, on-line learning, open course content, e-learning, and technology integration via distance learning, synchronous/asynchronous learning, applications of distance education, and successful distance education.

Print material was sought through the UNISTAR University of Northern Iowa (UNI) Library catalog. These resources proved to be valuable tools in the review of literature on the topic. On the advice of the University of Northern Iowa Instructional Technology Division professors, the following resource authors were recommended; Sharon Smaldino, Michael Moore, David Jonassen, and Charlotte Gunawardena.

The evaluation of Internet resources was the most difficult task. The majority of resources found on the Internet did not reference the originating source of the information. Additional research was conducted by first confirming the creditability of the author of the Internet resource. This was accomplished by researching the author of the publication, discovering the author's academic credentials, finding other publications

in which the author may have had a part in publishing by using the Yahoo and Google search engines.

The researcher determined the value of resources used in this review of the literature by evaluating the scope, audience, and timeliness. The scope of each resource was based upon the comprehensiveness, knowledge, and experience that was displayed within the research. The researcher used resources that were more academic than practitioner-oriented. These resources were peer-reviewed and better reflected the general acceptance of the information by authorities in the field.

ANALYSIS AND DISCUSSION

Distance education seems to be a new concept within the field of education. This concept is not as much new as reestablished. The analysis and discussion section will review distance education past of distance education by exploring its historical foundations. Distance education will be analyzed by examining the instructional models used within distance education; technologies that are used; the advantages and disadvantages; and the educators and learners who use it. The future of distance education will be reviewed by discussing how distance education will impact curricula.

Historical Foundations

Correspondence education, which is the earliest version of distance education, developed in the 1700s in Europe (Great Britain, France, Germany) and the United States (Willis, 1993). Before this practice of correspondence study, particularly in Europe, education had been available primarily to males in upper class of society (Hillman, Willis, & Gunawardena, 1994; McIsaac, 1993). The most effective form of this instruction was to bring students together in one place and one time to learn from one instructor (McIsaac and Gunwardena, 1996). Correspondence study was designed to provide educational opportunities for those who were not considered to part of the upper class society among the elite and who could not afford full time residence at an educational institution. At this point in time correspondence study was considered to be a method of substandard education (Willis, 1993; McIsaac and Gunawardena, 1996; Moore, 2003).

By the 1870s, correspondence courses began to gain international popularity (Aggasiz, 1971; Willis, 1993; Fleischman, 1998). In 1873 Anna Ticknor created the

Society to Encourage Studies at Home. The purpose of this society was to provide educational opportunities for females in society (Nasseh, 1997). This society served over 10,000 members within 24-year span. Moore (2003) notes that in 1883 Chautauqua College began to offer instructional courses through correspondence. Chautauqua College was authorized by the state of New York degrees to students who successfully completed coursework through correspondence during the academic year (Nasseh, 1997; Moore, 2003). In 1892 the University of Chicago, became the first major university to offer correspondence study programs in the United States (McIsaac and Gunawardena, 1996; Moore, 2003).

In the early 1900s, universities and private schools were offering correspondence courses to elementary, secondary, higher education, and vocationally-oriented learners. This was the accepted norm until the early to mid 20th century when instructional radio and television became popular (Willis, 1993; McIsaac & Gunawardena, 1996; Nasseh, 1997; Fleischman, 1998; Moore, 2003).

During the early 20th century distance education was provided through instructional radio Instructional radio emerged between 1910 and 1920. The United States government assigned more than 202 radio broadcasting licenses between 1918 and 1946 to educational institutions. Instructional radio seemed to be the "new wave" in education, but it did not succeed because it did not attract a large audience, institutions did not invest in the necessary technology, and instructors weren't willing to adopt the technology (Cuban, 1986; Nasseh, 1997; Moore, 2003). Although there was not much success with the integration of instructional radio, it aided in the transition from instructional radio to instructional television (Nasseh, 1997)

In the mid 20th century, after the end of World War II, 242 television channels were specifically licensed for instructional television (Moore, 2003). Cuban (1986) states that instructional television was introduced at a time when there were predicted teacher shortages and emphasis on improving the curriculum. With these issues needing to be addressed "reformers and administrators saw video as a surrogate teacher" (Cuban, 1986 p. 37). As cited in Sherry (1996), Cambre (1991) states that during the late 1950s and 1960s television production technology was typically restricted to studios and live broadcasts in which instructors conducted widely distributed classes. Experts in the field often taught the classes through instructional television. The use of instructional television within the field of distance learning failed to raise the status of distance education, because of inadequate broadcast times and the infrequency of use by instructors (Cuban, 1986; Cambre, 1991).

During the 1970s, a number of alternatives to traditional higher education arose in the United States (Nasseh, 1997). Reasons for these alternatives were rising costs of traditional residential education, increased interest in nontraditional education, and dissatisfaction with established educational institutions (Nasseh, 1997; Moore, 2003). One such alternative involved replacing teachers in the classroom with instructional television instruction. Professionally designed and produced television shows allowed students to be exposed to new educational concepts. This allowed learners the opportunity to gain knowledge through authentic instruction provided by professionals within the subject of study. The major drawback to this was a lack of two-way communications between the "professional" and the student (Cambre, 1991; Fleischman, 1998). During the 1980s, teleconferencing became more widely available to the public,

and increased the possibility of interactive communication (Willis, 1993; Fleischman, 1998). From the 1990s to present day, there has been an emergence of two-way teleconferencing delivering distance learning (Fleischman, 1998).

Along with the historical foundations, the technological advances of hardware and software of the past three decades have influenced distance education and the way instruction is provided. These technological advancements include, but are not limited to, local area networks (LANs), Internet and intranets, conferencing systems (both audio and visual), cable television, closed circuit or low-power television (similar to ICN), bulletin board systems (BBS) and electronic mail (Fleischman, 1998; Schamber, 1988; Barron & Orwig, 1993). The use of these technologies has facilitated an increase of public interest within the field of distance education. The advancement of technology has helped transform the instructional and learning methodologies of distance education from correspondence study to the technology based method that is used today.

Instructional Models of Distance Education

The advancements of electronic technology contributed to the transformation of the methodology of distance education. As these electronic technologies became readily available, the number of students and universities offering distance education courses grew (Garrison, 1990). The development of distance education instruction attempts to address various models of distance education while attempting to determine which implementation strategy works best for which students (Garrison, 1990; Dede, 1996).

The factors used in attempting to determine which strategies work best for which student include the learner, the instructor, and the technology (Garrison, 1990). While considering this issue, Keegan (1986) declared that successful distance education is

learner-centered and distance educators must investigate how the learner, instructor, and technology collaborate to create a meaningful learning experience. Keegan also highlights that learner-centered instruction encourages students to take responsibility for their own skill development and learning.

Garrison and Shale (1987) expressed that distance education must involve two-way communication between teacher and student for the purpose of facilitating and supporting the educational process. Their work supports the assertion that the foundations on which instructional models are based can be affected by the way information is communicated to the student. Instructional models are also based upon the way that the student makes sense and constructs new knowledge from the information which is presented (Bredo, 1994). These ideas have instigated research into which instructional models work best within a distance education environment. Based upon this research, recent studies have shown the most prevalent models of distance education are transactional distance, social context, interaction theory, and control (McIsaac, 1993).

Transactional distance model: Transactional distance is not determined by geographic location, but is determined by the transactions and relationships between the learner and the teacher (Moore, 1990; Saba and Shearer, 1994). The true definition of transactional distance varies depending upon what students need to learn and what instructors need to teach, but it reflects the mutual exchange of information between participants (Moore, 1973; Saba and Shearer, 1994). This information exchange can be measured as having a high or low transactional distance based upon the amount of direct communication that is experienced between the learner and instructor. A comprehensive textbook or study guide would have a high transactional distance because there is little to

no direct communication between the learner and instructor. Direct discussion between an instructor and learner would exemplify low transactional distance because of the abundance of communication between them. The concept of the transactional distance model, however, is based upon three considerations: structure, dialogue, and learner autonomy (Moore, 2002). Moore describes structure as the design, organization, and the media used in the course and instruction. Structure reflects the types of educational objectives that need to be met, the teaching strategies and methods used by the instructor, and evaluation of students and instructor participation in the course. Structure also describes how an educational program addresses the needs of the learner (Saba and Shearer, 1994; McIsaac and Gunawardena, 1996). Classes that have a high degree of structure typically have a high transactional distance because the class materials are easily understood and there is not a great need for dialogue between teacher and students. Classes that have a low degree of structure need more frequent and more substantial communication between teacher and students, and therefore have a lower transactional distance.

Dialogue is represented by the way the information is processed, encoded, and decoded by the student. This encoding and decoding process is an integral part of the learning process. This encoding and decoding process allows learners to analyze, synthesize, and evaluate the information learned to create a more meaningful learning experience. Learner autonomy is based upon the learners' sense of personal reliability and self-direction (Moore, 1993). Learners determine their learning objectives as they relate to the subject matter by taking a proactive role in the learning process.

Social context model: The social context model is used to examine social factors in distance learning environments where the communication process is mediated and the learning environment is different than traditional classroom settings. The social context model also examines the educational techniques used in instruction and learning. This model is still in its developmental stages. The social context model is based upon how the environment affects motivation, attitudes, teaching and learning (McIsaac, 1993). McIsaac and Gunawardena (1996) explain that in 1990 the social factor model, a predecessor to the social context model, was created to examine specialized computer environments and electronic social environments for participants who worked in groups. One of the determining factors within this model is social presence. This is the way in which a person feels communally present in a particular learning environment (McIsaac and Gunawardena, 1996). This factor is integral because technology varies the level of "social presence" that a learner may experience. The level of social presence affects what learners know and think about other participants, their characteristics, and traits (Short, Williams, & Christie, 1976). An example of social presence would be the way a learner participates within the learning environment. A student would have to be active within a distance learning environment to have a high level of social presence. If he or she were not active no one would realize their presence within the environment. The more active a person is within the environment, the more his/her presence is evident.

Technology is often considered a neutral medium because it is adaptable to a variety of settings (McIsaac, 1993; McIsaac 1996). The instructional methods and technologies are often used without paying attention to the social setting or the recipient culture in which it is to be used (McIsaac, 1993; McIsaac 1996). Properly integrated

technology promotes interaction and helps reduce discrimination patterns and provides social interaction equality among most participants. Introverted learners are often overlooked in a public setting and they are not considered socially equal. These participants, however, may choose to communicate in a text-based format through on-line methods because it is less intimidating (Gunawardena, 1993).

The interaction model: The interaction model is based upon the relationships created between the teacher, learner, and environment. These relationships have an effect on instruction and learning processes because distance education is an interactive process (McIsaac, 1993) Moore (1989) focuses on three specific relationships within the context of this model:

1. Learner/Instructor
2. Learner/Content
3. Learner/Learner

Learner/Instructor interaction is instruction where there is an interface between the learner and the instructor. This type interaction has the goal of stimulating, motivating, and facilitating educational activities and learning experiences (Moore, 1989). Learner/Content interaction is self-defining as it is the interaction between the learner and the content or subject of study. This interaction can lead to changes in perspective and knowledge construction based upon the way the learner interacts with the content to be learned (Shelton, 2000).

Learner/Learner interaction transpires between a learner and other learners in a group setting, with or without presence of an instructor. This type of interaction can be valuable in the learning process by allowing learners to gain insight from other learners.

These types of interactions and insights can make the learning process easier (Moore, 1989).

Hillman, Willis, and Gunawardena (1994) took the focus of Moore's work a step further by adding a fourth relationship recognized as Learner/Interface. This type of interaction is based upon the feelings the students display toward their instructor and classmates (Sherry, 1996; McIsaac and Gunawardena, 1996). It is the responsibility of the instructor to assist this type of interaction (Barker & Baker, 1995).

Instructional interaction is described in Wagner (1994) as an event that takes place between the learner and the learner's environment. The purposes of instructional interactions are to have an effect on the learners by encouraging them to reach goals. Learning goals can only be reached through interaction within a distance education environment (McIsaac and Gunawardena, 1996; Palloff and Pratt, 1999).

Control Model: Rooter (1989), highlights that the control model explores existence of a locus of control. Locus of control spotlights the level of responsibility that an individual assumes within the instructional and learning processes. There are two locus of control types, internal and external. A learner with an internal locus of control believes that personal action affects the overall outcome of a learning situation. Learners who recognize an internal locus of control are more likely to continue in their educational endeavors. This occurs because the learner feels success in personal accomplishment, and they want to continue feeling that type of satisfaction (Altmann & Arambasich, 1982; Rotter, 1989). For example, learners who participate in a distance learning environment will feel more gratified when completing an assignment or learning something new.

The second type of locus of control is an external locus of control. A learner with an external locus of control believes that extraneous circumstances determine overall outcome of a learning situation (Altmann & Arambasich, 1982; Rotter, 1989; McIsaac, 1993; McIsaac and Gunawardena, 1996). Students who exhibit an external locus of control may feel that their work efforts may be pointless because their previous efforts have only produced disappointment (Altmann & Arambasich, 1982; Rotter, 1989). For example, if a student participating in distance education does not submit his/her assignment on time; the student could blame the fault on the computer.

Each of Moore's models can be addressed through the use of technology. It is imperative to realize that just as models are adaptable to promoting different learning experiences for the learners, the use of technology offers various methods of implementation that will have an effect on the instructional and learning process. The technologies used are media that improve the learning situation by using tools and/or machines to do tasks more effectively to accomplish a task (Bergen County Technical Schools, 2005).

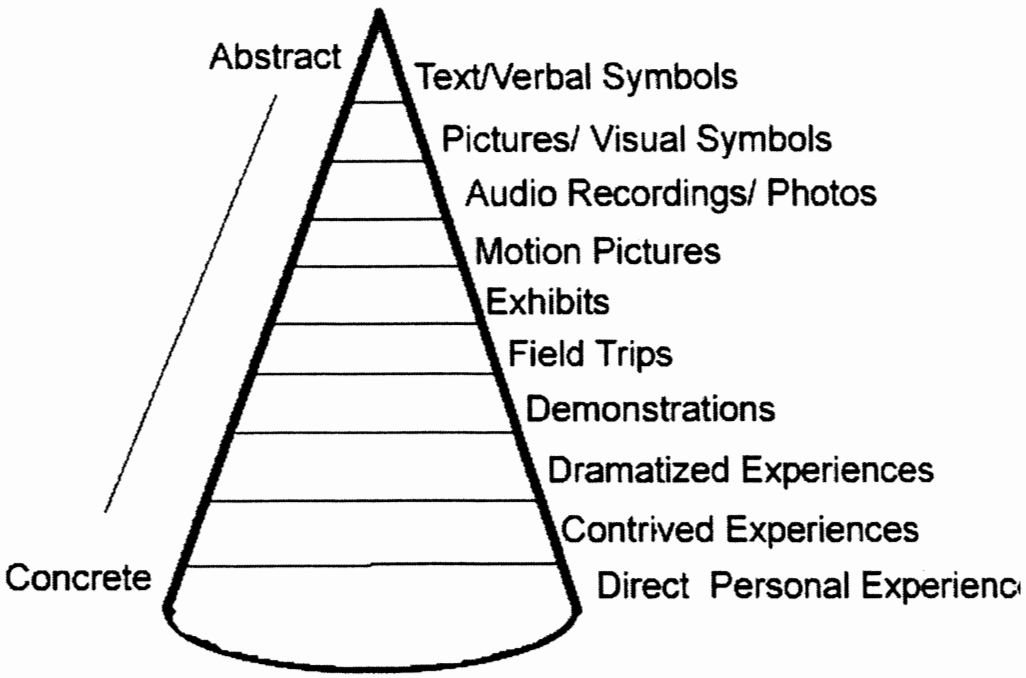
Technologies of Distance Education

The opportunities for interaction within distance learning environments has been expanded by the advancement of technology. Simonson et al. (2003) provide a taxonomy of the technologies used in distance education. This taxonomy consists of the following components:

1. Correspondence,
2. Prerecorded media,
3. Two-way audio,
4. Two-way audio with graphics,
5. One-way live video,
6. Two-way audio/one-way video,
7. Two-way audio/video, and
8. Desktop two-way audio/video (p.90)

Dale (1946) introduced a visual model used to classify learning experiences called the "Cone of Experiences". This model is based upon the premise that learning experiences progress from the concrete experiences (at the bottom of the cone) to most abstract (at the top). Figure 1 depicts the ideas presented within the Dale's Cone of Experience. The Cone of Experience can be used to organize media used in delivering distance education (Simonson et al., 2003).

Figure 1. Dale's Cone of Experience



Graphic patterned after grapic created by Edward Cousins Jr.

Just as Dale's Cone of Experience progressively moves from abstract to concrete concepts, the technology taxonomy provided by Simonson et al. also progress from abstract to concrete technologies.

As mentioned earlier in this literature review, distance education can be traced back to the 1700s and the beginnings of print-based correspondence study in the United States. The simplest technology used for distance education was *correspondence study*. Correspondence study usually employs some sort of mailing system to promote interaction (Simonson et al., 2003). In most cases coursework is sent to the student who completes the assignment and submits it to the instructor for evaluation (Simonson et al. 2003; McIsaac and Gunawardena, 1996; Sherry, 1996; Aggasiz, 1971). Correspondences

study is fairly inexpensive and can be used for any particular learning situation (Schamber, 1988) The weakness to this type of instruction is that there is a time delay between the sending and receiving of materials (Simonson et al. 2003; McIsaac and Gunawardena, 1996; Sherry, 1996). Correspondence study is a form of asynchronous distance education. Examples of correspondence would include but are not limited to email and postal services (Aggasiz, 1971). The most abstract level of Dale's Cone of Experience is based on the media of text and verbal symbols; correspondence study reflects this level because correspondence study is conducted primarily through the use of text.

Both historically and conceptually the next technological in the development of distance education is *prerecorded media* (Simonson et al., 2004). Prerecorded media is a form of asynchronous communication this includes but is not limited to prerecorded video and audiotapes, television production, and instructional radio (Cuban, 1986; Fleischman, 1998). Prerecorded media was typically sent in conjunction with correspondence materials to add a visual or audio component to distance education (Simonson et al, 2003; Palloff and Pratt, 1999; Sherry, 1996; McIsaac, 1993). A strength of prerecorded media is that the use of audio and/or video can serve as a guide for student participation in the distance learning environment. Although students can hear and see information related to the subject of study, there is a lack of two-way communication between the instructors and the student (Cambre, 1991; Fleischman, 1998). An example of prerecorded media used today would be the "self-help" language series in which students learn a foreign language by using an audiotape or CD with printed material.

An example of the third technology within the taxonomy, *two-way audio*, is audio teleconferencing. Audio teleconferencing is based on a typical person-to-person telephone call. Audio teleconferencing is a type of telephone call where the discussions can be expanded to more than two people through the use of conference calls. Two-way audio enhances the educational process by allowing direct communication between participants within the distance education process. Two-way audio can provide interaction based upon correspondence study (Cambre, 1991). The strength of this technology is that the instructor and learner can simultaneously play an active role in the learning process. The weakness of this technology is that participants are not able to see each other, nor are they able to see any visuals that may be used (Simonson et al., 2003).

The next type of technology in the hierarchy *is two-way audio with graphics*. The components of two-way audio are used with the additive elements of visuals. Visual materials can be used to supplement the elements of two-way audio communications (Simonson, 2003; McIsaac and Gunawardena, 1996; Sherry 1996). A strong feature of these technologies is that participants can share visuals as well as audio commentary (McIsaac and Gunawardena, 1996). The weakness of these technologies is that the graphics are usually limited by the method in which they are sent. An example of this technology would involve using a facsimile machine to share graphics while participants are taking part in an audio conference (Moore, 1993).

Progressing down the taxonomy, the next step is *one-way live video*. These technologies are representative of the instructional television used during the 1950's and 60's. This is commonly referred to as "broadcast distance education" (Simonson et al., 2003, p.94). This is usually accompanied with one-way audio. One-way video allows for

seminars and meetings from satellite (or some type of broadcast) to be seen live or taped. The taped version can be used later as a form of prerecorded media. In most cases learners watch the television broadcast and participate in the learning process. Simonson et al. (2003) state that a major strength of these types of technologies is that the broadcast produces "high quality" presentations (p.94). However, the drawback to this technology was that there was a lack of communication between the participants. The instructor spoke and the students listened.

The sixth category of the hierarchy *is two-way audio/one-way video*. This category is a mixture between the two-way audio and one-way video technologies (Schamber, 1988). Participants are able to synchronously communicate and play an active role in the instructional and learning processes. The weakness to this technology is that it requires costly equipment to provide instruction; such as television cameras, a studio, and microphones. An example of this combined technology is a "call-in" television course. The lesson is presented over television and the participants can call the instructor to answer discussion questions posed or they may ask questions about the subject being discussed.

The seventh category provided by Simonson is *two-way audio/video*. This technology requires a "special classroom" that has audio and visual equipment to provide and receive instruction (McIsaac and Gunawardena, 1996). Within this classroom participants are able to communicate with each other and the instructor. An example of this technology and the "special classroom" would be the Iowa Communications Network (ICN) (Simonson et al, 2003; McIsaac and Gunawardena, 1996).

The ICN is a digital network that cost $88,762,321 to plan and implement. It connects over 800 remote classroom sites throughout the state of Iowa via fiber optic cable (ICN, 2005). Video, voice and data signals are encoded and transferred over the fiber optic network. The two-way audio and visual communication experienced through the ICN usually consists of an origination site, the location from which the instructor teaches (also referred to as a face-to-face class), and receiver sites (ICN, 2005). This technology allows for learning to take place through two-way audio and two-way video. The weakness to this technology, however, is that it is very expensive to implement, operate, and maintain. The ICN costs approximately $2,234,330 a year to operate (ICN, 2005).

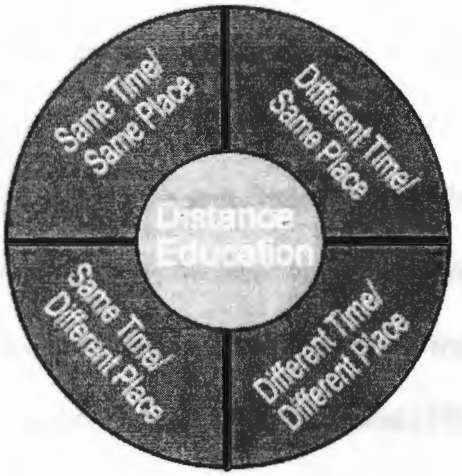
The last category in the taxonomy of technologies is *desktop two-way audio and two-way video*. This type of technology is a computer facilitated two-way interactive audio and visual communication mode conducted through personal computers (Simonson, 2003). Desktop two-way audio and two-way video is less expensive than normal two-way audio and two-way video. Desktop instruction is easily accessed through the use of desktop personal computers. This ready access allows users to use a familiar technological tool to communicate with instructors and classmates (Palloff and Pratt, 1999; Fleishman, 1998; Schamber, 1998). There are two limitations, however. First, the images are usually transmitted at 15 images per second which is half the normal video speed. This causes the video to appear somewhat jerky. The connection between the computers is a second concern (Simonson et al., 2003). Desktop video conferencing can transmit over any type of Internet connection, but the throughput of the connection affects the video conferencing performance. The operating system through which the

conferencing takes place can also affect video conferencing performance (Simonson et al., 2003).

Each of these technologies plays an integral role in the distance education process. Although each technology offers a distinctive perspective to distance education, there are strengths and weaknesses of each. The delivery method in which the technology is used occurs in four categories. These categories in which the technologies fall are known as quadrants that represent the ways in which distance education is delivered. Figure 2 represents the four quadrants.

1. Same Time/Same Place (ST/SP)
2. Different Time/Same Place (DT/SP)
3. Same Time/Different Place (ST/DP) and
4. Different Time/Different Place (DT/DP) (Simonson et al., 2003 McIsaac and Gunawardena, 1996; Johansen, Martin, Mittman, and Saffo, 1991)

Figure 2. Four Quadrants of Distance Education



According to Simonson (2003) same time/same-place describes the traditional, face-to-face, educational setting whether it is in a classroom, conference room, or computer lab. McIsaac and Gunawardena (1996) explains that facilitation of face-to-face learning can be enhanced through the use of technology. The same time/same place method is the most common method of instruction promoting interaction and synchronous communication (Simonson et al., 2003).

The different time/same place of instruction usually occurs on an individual basis (Simonson et al, 2003; McIsaac and Gunawardena, 1996). The different time/same place instruction involves asynchronous communication allowing objectives to be met by allowing learners to learn at their individual pace (McIsaac and Gunawardena, 1996; Simonson et al., 2003). This type of instruction usually takes place in a location where learners meet with other participant within the distance education environment. An example of different time/same place would be, students using the same computer in a designated learning station, and the participants post messages to a bulletin board or discussion area (McIsaac and Gunawardena, 1996; Simonson et al., 2003).

Same time/different place instruction also allows for synchronous communication. Through the use of telecommunications, informational technologies, teaching and learning can take place at the same time while students and faculty are at different locations (Johansen et. al, 1991; McIsaac and Gunawardena, 1996; Simonson et. al, 2003). This type instruction allows interaction beyond the traditional synchronous classroom setting. According to McIsaac and Gunawardena (1996) there are two types of same time/different place instruction:

1. A meeting where the participants are separated by geographic distance and interact simultaneously, and
2. The uses of open broadcast such as live television and live radio, where learners are not simultaneously interacting with the instruction.

Within the first type of same time/different place instruction, learners are separated by geographic distance but participate in a synchronous learning environment. These synchronous learning environments allow students to interact with each other and with the instructor. These settings might include the use of the Internet and on-line chatting systems. An example would be posting to a discussion board or participating in a discussion within an online learning environment. In the second example of same time/different place, learners would not be interacting with the instructor. Students would be in different locations watching a television show that provides instruction as part of an organized learning experience.

Simonson et al. (2003) states the "most authentic form of distance education occurs within the fourth quadrant, different times and different place" (p.8). This type of interaction gives meaning to anytime-anywhere. The technologies used within this quadrant usually provides for interaction through asynchronous communication. The different time/different place quadrant requires information to be sent or posted and then the sender has to wait for a response. The responder/learner will reply at a convenient time. Most distance education takes place in this manner because it is rare to have all learners in the same place at the same time (Simonson et al., 2003).

Technologies used within distance education have been used to bridge the gap of space and time. The idea that teaching and learning can successfully take place between

teachers and students who are separated by space and time is a topic of great debate. There are proponents who state that distance education is advantageous to learners, while non-supporters point to the detrimental effects that distance education has on student learning (Atkinson, 1999).

Advantages of Distance Education

Advancements in technology have changed the face of distance education. Improved access and availability of electronic technology have enabled learners to participate in the learning process. Most learners that participate in distance education enroll in distance education courses for convenience. These learners may be bound by the constraints of time, work or travel (Palloff and Pratt, 1999; Clark, 2001). Whether the learner is one of a traditional or non-traditional background there are advantages to distance education that the learner can anticipate.

- Distance education is designed to be learner centered. The pacing and style of the learning is left up to the learner.
- Distance education is considered an equalizer by allowing classmates to interact without regard for appearance, race, sex, ethnicity, or other common prejudices.
- Distance education can allow for interaction and collaboration within the learning environment.

(McIsaac and Gunwardena, 1996; Greenwood, 1998; Kearsley, 1998; Trinkle, 1999; Poole, 2000; Clark, 2001)

Distance education allows learners to experience the flexibility of course offerings, to experience self-paced learning and the opportunity to study without having

the pressure of meeting within a traditional classroom environment (McIsaac and Gunwardena, 1996; Clark, 2001). In asynchronous online learning, students can access the online materials at anytime, while synchronous online learning allows for real time interaction between students and the instructor (Simonson et al., 2003 McIsaac and Gunawardena, 1996; Johansen et al., 1991). For example, learners can use the Internet to learning materials and can communicate with experts in the field in which they are studying.

Kearsley (1998), a professor of instructional technology and distance education, explains that inexperienced learners who have little or no experience with on-line learning or teaching tend to embrace some misconceptions. The most common misconception is that distance education courses will be boring and impersonal. Kearsley points out that once a person starts to interact with other group members, he/she quickly discovers that an on-line learning environment can be very rich and very personal "...people typically find that they are drawn into the subject matter of the class much more deeply than in a traditional course because of the discussions they get involved in" (Kearsley, 1998 p. 1). He then suggests that distance education minimizes the unfairness that is often displayed in traditional face-to-face settings. "Unless someone deliberately reveals personal information, participants have no idea about the age, gender, ethnic background, or physical characteristics of others on-line" (Kearsley, 1998 p. 1).

Poole (2000) indicates that the interactive components of distance education aid instructors and learners in gaining more from the learning experience. The learner can acquire the information needed from several sources via the computer traditional research text, and off-line sources. Learners may use personal experiences or information gathered

while collaborating with other learners to facilitate learning. Interactive television and the use of the Internet demonstrate how distance learning can provide resources and opportunities to enhance curriculum and student learning.

While there are advantages to distance education, there are opponents to distance education. In order to gain a full understanding of how distance education is viewed the disadvantages of distance education will be explored.

Disadvantages of Distance Education

Opponents of distance education suggest that some learners and educational institutions are unable to receive the same advantages as other students who are able to use distance education (Ravaglia & Sommer, 2000). This provides an issue of equity between the "haves" and "have nots". Beyond this issue of equity opponents argue that the major disadvantages of distance education are:

- Distance education encourages isolation of the learner. This causes social interactions to become limited unless technology and class assignments encourage interaction.
- Distance education requires that the learner is disciplined enough to work independently.
- Distance education requires that the students have a high degree of comfort with the Internet. (Greenwood, 1998; Rangecroft, 1998; Ravaglia & Sommer, 2000; Truell, 2001).

With the increased availability and choice of new technologies many new concerns have arisen about the quality of instruction and the threat distance education may pose to the already established methods of teaching and curriculum. Rangecroft

(1998) believes that the realm of distance education is clearly a growth area within the educational arena and will continue to be so for the foreseeable future. Rangecroft cautions, however, that a disadvantage of distance education is a sense isolation felt by distance learners.

This sense of isolation makes the learner feel as if he/she is alone in the learning environment by being cutoff from other learners and instructors. One of the methods of interaction relies on the interaction between the instructor and the learner. If this interaction is ineffective in a traditional classroom environment where the student could see and communicate with the instructor, the technological integration can make instructional and learning methods further ineffective by requiring students to use technology and adding the concepts of separation of time and/or place (Truell, 2001). The computer and Internet have become dominant when addressing distance learning technologies and hold the potential for taking away the human aspect of learning; consequently, learners do not have a meaningful learning experience because they are unfamiliar with the technology (Truell, 2001; Ravaglia & Sommer, 2000).

Online learning requires a significant number of hours each week. It requires that the learner have a level of self-motivation and self-discipline. Students who are prone to procrastination or need a great deal of routine in their lives will find distance classes a challenge Truell, 2001).

The Internet is an effective delivery medium that enables communication of knowledge at the student's convenience (Truell, 2001; Ravaglia & Sommer, 2000). It has the potential, in fact, to change the nature of distance learning. Although Truell (2001)

notes that there is some fear with using the Internet. Many learners can be apprehensive when they have to rely on the Internet for courseware and communication.

Given the advantages and disadvantages to distance education, it is undeniable that distance education is here and it plays a role in education. The next section highlights the role of distance education by exploring those who presently use it.

The Present of Distance Education

The U. S. Department of Education (2003) indicates that there is widespread growth in the use of distance education by K-12 schools, higher education, and continuing education, corporate training, military, and government training, telemedicine. During the 2002-03 school year the national statistics showed that 38% percent of public high schools offered distance education courses, 20% of the higher education institutions offered distance education courses. Four percent of middle schools and approximately 1 percent of elementary schools offered some sort of distance education course. The participant numbers reflected that 45,300 students were enrolled in advance placement courses, representing 14% of the total distance education enrollment for the year and approximately 48% of students with distance education experience enrolled in distance education courses delivered by institutions of higher learning (National Center of Education Statistics, 2005).

Regardless of the arguments that support and oppose distance education it is a given actuality. Distance education is here and will play an important role in the educational process. In order for distance education to be effective, it requires the combined efforts of several participants, including students, faculty, facilitators, support staff, and administrators. When effectively integrated, each brings a unique capability to

the field of distance education (Palloff and Pratt, 1999; Willis, 1993). Ultimately meeting the instructional needs of students is the keystone of distance education. This is the test by which all components in the field are determined (Willis, 1993). In many distance learning environments, the instructor finds it beneficial to use a site facilitator to help in the effective delivery of course content. The facilitator acts as a bridge between the students and instructor (Palloff and Pratt, 1999).

According to Willis (1993), support staffs are the silent heroes of successful distance education programs. Successful distance education programs typically centralize support service functions. Administrators are typically influential in setting a direction for an institution's distance education program. Administrative leadership and continuing interest and support are essential to the growth of distance education programs (Pratt and Palloff, 1999; Willis, 1993).

In 1988, the Office of Technology Assessment (OTA) released a statement that declared, "...teachers have to be allowed to choose, they are willing to make choices, and are qualified to implement their choices effectively" (p. 1) The OTA found there is no one best use of technology; there is no one best way of teaching with technology. Flexibility should be encouraged, allowing teachers to develop their personal teaching approach utilizing the variety of options offered by technology (OTA, 1988).

Every new technological advance brings with it new possibilities for distance education. Distance education has evolved from the simple postal correspondence courses to television and radio, two-way videoconferences, and on-line learning environments. During the 2002-2003 school year 49% of school districts chose to use two-way audio/video to support the distance education experience

The keystone to successful distance education is ensuring that education is meeting the needs of the learner. Pou (2005) provides an example of how distance education had made an impact him, as a distance education participant.

> "In 1999, at the age of 34, I went back to school attending classes at Central Georgia Technical College after working an 8-hour day. After attending for about a year and a half, I had to discontinue my studies for a time because of the toll it was taking on me both mentally and physically. I decided to continue my education on-line through their distance education program. This mode of learning allowed me to take as many classes as I felt I could handle while being afforded the opportunity to go at my own pace. Granted, I was not able to physically interact with my classmates, or my instructor, but through the use of e-mail, I was able to effectively communicate with them.
>
> Through the use of distance education, I am able to obtain a first rate education on my terms and achieve the goals that I have set for myself through an accredited institution."

Distance education is being applied in a variety of learning situations. Those who choose to use it, take advantage of what distance education has to offer. The consumers of distance education, creates the type of impact the distance education has on educational curriculum.

Distance Education's Impact on Educational Curriculums

Distance education courses provide learning benefits both inside and outside of the classroom for all students. Distance education can provide a medium for basic/introductory instruction as well as advanced instruction for self-motivated students without removing them from their normal learning environments (Ravaglia & Sommer, 2000). In the case of K-12 curriculum, distance education can augment rather than replace traditional classroom instruction (Washington, 1997). This augmentation can take place by providing flexibility with regard o place and time for learner and instructor participation (Ravaglia & Sommer, 2000).

Distance education can provide the K-12 curriculum resources to meet the needs of students by offering various methods of instruction to appeal to the students' learning styles (Ravaglia & Sommer, 2000). Ausburn and Ausburn (1978) explored the idea of adapting instruction to meet the needs of different learning styles. The authors found that there are two methods of accomplishing this: conciliatory supplantation and compensatory supplantation (Ausburn & Ausburn, 1978; Washington, 1997). Conciliatory supplantation is similar to the idea of student-centered learning because the instruction is based on instructional models that the learner prefers. Whereas, compensatory supplantation reflects a teacher-centered instructional environment, where the learning is expected to be effective for students by offering some form of compensation for learning (Ausburn & Ausburn, 1978; Rotter, 1989; Washington, 1997).

According to Truell (2001) Internet tools are used to enrich communication between the learners and the instructors. This statement supplements the idea of distance

learning by providing school curricula with the capabilities to meet the needs of students and instructors, while simultaneously enhancing the educational experience. Ravaglia & Sommer (2000) also portray the opinion that by offering distance education programs to students, the educational institution is not avoiding responsibility, but rather meeting the educational needs of the students.

Distance education permits educational institutions to adapt their course offerings to learners beyond their traditional delivery system and standard curriculum (Washington, 1997; Ravaglia and Sommer, 2000). It can overcome regional differences in access to education. Learners may be able to take courses not offered by their particular learning institution (Atkinson, 1999). Interested learners can take language courses not offered by their school.

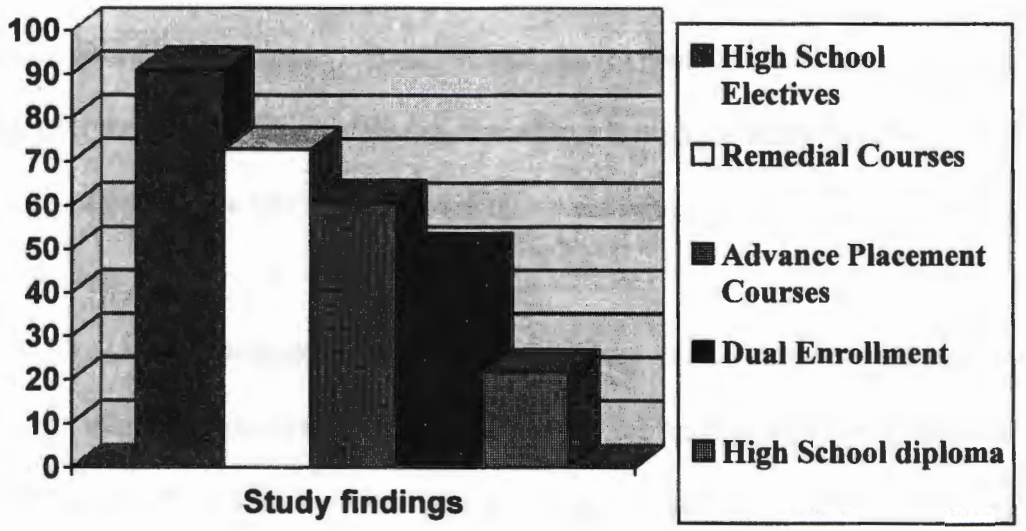
The use of distance education can "transform education by creating learner-centered instructional environments" (Poole, 2000, p. 165). These environments enhance the traditional learning environment. Distance education allows for a student-based learning approach that actively engages students in the learning process (Ravaglia & Sommer, 2000). Learning within these transformed environments occurs through meaningful experiences and direct encounters between the learner and the content. Examples of these transformed learning environments include guided inquiry activities such as webquests or problem-based learning cases.

When focusing on distance education within the K-12 learning environment, the term "virtual school" is used to describe an educational organization that offers K-12 courses through Internet- or Web-based methods (Clark, 2001). A study was conducted by Clark (2001) of the Distance Learning Resource Network, confirmed the issues and

trends within virtual high schools in the United States. Within this study Clark noted that a majority of virtual schools appear to use some degree of on-line instruction as the preferred instructional method. Many of these organizations offer some sort of face-to-face education as well.

Clark's study focused on learner adaptation based on the course offerings within the virtual school. Clark found that nine out of ten virtual schools offered elective high school courses. Seven out of ten offered remedial courses, approximately 60% offered advance placement courses, 50% offered allowed students to enroll in more than one course, and 22% offered a high school diploma (Clark, 2001). Figure 3 represents the findings of Clark's study.

Figure 3. Virtual School Course Offering



Within this study, Clark also pointed out that the concept of transparency is the key in the success of virtual schools. Transparency is the ability to ignore the technology interface and fully concentrate on learning (Bancheri, n. d). Instructors and learners

should not have to worry about how the technology works, they should only have to focus on using the technology to facilitate the learning process (Bancheri, n.d.) Having the proper technical resources, tools, and delivery platforms for local instructional conditions are important considerations for distance education courses (Clark, 2001). Clark also noted within the 2001-2002 school year there was an enrollment of 40,000-50,000 students participating in the virtual school environment. These numbers are predicted to increase as the virtual school becomes more popular.

During the 2000–2001 academic year, 56% of the two-year and four-year degree-granting institutions offered distance education courses for any level or audience (US Department of Education, 2003). Statistics from the United States Education report showed that 12% of all higher education institutions surveyed planned to start offering distance education courses in the next three years (2002-2005); 31% did not offer distance education courses in 2000–2001 and did not plan to offer these types of courses in the next three years. These statistics also reflect that public institutions were more likely to offer distance education courses than were private institutions (US Department of Education, 2003).

The U. S. Department of Education (2003) report also stated that college-level or credit-granting distance education courses at either the undergraduate or graduate level were offered by 55% of all two-year and four-year institutions in the United States. These distance education courses were offered at the undergraduate level by 48% of all institutions, and 22% at the graduate level.

Distance education is currently being used in many different types of learning institutions from elementary school, where children can learn foreign languages, to

higher education settings where learners are obtaining advanced degrees in particular fields of study. For example, the University of Phoenix offers approximately 60 on-line courses to students' throughout the United States which comprise undergraduate degrees in the accounting, administration, e-business, management, marketing, information technology; graduate degrees in education, business, technology management, and health administration (U.S. Department of Education, 2003).

Distance education is impacting educational curricula by augmenting traditional classroom experiences and tailoring to the educational needs of the learners. The information presented thus far, has highlighted the past and the present of distance education, leaving one question to be answered: What is next step for distance education?

The Future of Distance Education

Supporters of distance learning, (e.g. McIsaac, Greenwood, Kearsley, Trinkle, Poole, and Clark) predict that distance education will replace regular classroom instruction. Some institutions view distance education as an inexpensive alternative to hiring more faculty, but these institutions should be aware that not all students are best served by distance educational methodologies (Trinkle, 1999).

Distance education is developing and changing so rapidly that no one can precisely predict the future, but "it is clear that the market for distance education will continue to expand" (Neal, 1999, p. 43). There are benefits to using some forms of distance education. Learners will have the opportunity to take classes and continue their education without the constraints of location and time (Trinkle, 1999; Clark, 2001).

Academic institutions, corporations, and nontraditional students embracing the concept of distance learning should be aware that teaching techniques and strategies,

student attitudes, and potential issues need to be considered when planning distance education courses (Palloff & Pratt, 1999). Some educators believe that, as distance education moves forward, distance learning will require a new pedagogy because traditional teaching methods, where the class is teacher centered, do not provide the optimal learning experience in the distance education arena (Markel, 1999; Palloff & Pratt, 1999). This new pedagogy in distance education supports the assertion that the classes offered through distance education need to be student-centered rather than teacher-centered (Markel, 1999). Moreover, some educators maintain that the use of electronic media requires new teaching strategies "...moving from assigning individual projects to collaborative projects; using methods that accommodate various learning styles and expanding the students learning resources..."(Markel, 1999, p. 212).

CONCLUSIONS AND RECOMMENDATIONS

This review of literature has revealed that using today's technology provides a new venue for delivering education to all interested learners. The introduction of new technologies into instruction within distance education has entered a new era. These technologies have given distance education a different appearance in how it can and will be applied.

The history of distance education has revealed that its origins are rooted in correspondence study. Distance education has evolved from "snail mail" to the electronic form used today. Each of the technologies and models of distance education cited bring a unique aspect to distance education by allowing learners to be a part of the learning process. The historical foundations have shown that distance education has been a long-standing aspect of education. As time progresses the concept of distance education has, and will, continue to adapt to the needs of an ever-changing society.

The advantages and disadvantages of distance education have been presented. One cannot overlook the fact that distance education affords learners an opportunity to participate in learning environments that lack the bias of traditional face-to-face settings. Learners are able to work at their own pace without the "in class" performance pressure. These learners have to possess the characteristics of self-directness, self-motivation, and be self-disciplined. Distance education also provides an opportunity for learners to participate in educational experiences that they may not otherwise have.

Different pedagogical beliefs about distance education programs have created different views of distance education among academics. Advocates of distance education programs point to technological advances and the success achieved by some programs to

predict that the adoption, diffusion, and dissemination of distance education programs will increase as society and technology change. Opponents of distance education programs point to the weakness of the distance educational process by noting that distance learning can cause a lack of personal interactions between teachers and students.

The supporters and opponents of distance education enlighten us on why one methodology should be chosen over another, but in a world where everything is changing we must adapt to the changes we encounter. The effectiveness of distance education is comparable to traditional classroom instruction and student performance. Distance education enhances educational curriculum and benefits the students as well as the instructors by providing access to both students and teachers by allowing participants to become involved in the process of learning.

Distance education learning environments will not replace the traditional classroom completely. They have the capabilities of augmenting the traditional classroom experiences and increasing student learning at all levels from elementary thorough postsecondary education, through collaborative efforts exhibited between traditional and distance educational programs.

Technological advancements and pedagogy have caused the field of distance education to become synonymous with engaging learners in the learning process. The amalgamation of these technologies have helped bridge the gap of space and time. Learning can take place in any given space and at any time, because the learner's connection to the learning environment is only a click away.

The rapid changes within the field make it difficult to forecast the future of distance education. It is clear, however, that the market for distance education will continue to expand and remain a stronghold in the educational community.

Based upon the information presented within this literature review it is recommended that distance education be considered a serious educational venue. There are two major variables that need to be considered before engaging in distance education. These variables include the methodology of distance education that will be used and what the types of technologies that will be used to facilitate distance learning. These variables can be used via numerous combinations. It is important that learners have a general idea of what they can expect by looking into distance education. It is also recommended that the promotion of lifelong learning be continued through the practice of distance education. This can be accomplished by providing learning opportunities for both students and instructors. This concept of lifelong learning is a new process and calls for new methods of teaching and learning objectives will be developed when dealing with distance education.

As an advocate of distance education, I have found that distance education offers non-traditional students opportunities to educate and re-educate themselves, while simultaneously allowing traditional students a chance to learn through a new medium of educational instruction. Distance education is a tool that expands the educational process by offering a method that can serve as both an augmentation to present curricula as well as an alternative to traditional classroom face-to-face instruction. As society progresses, so will the areas of technology, education, and distance education. These advancements will have a great effect on the educational processes of instruction and learning.

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